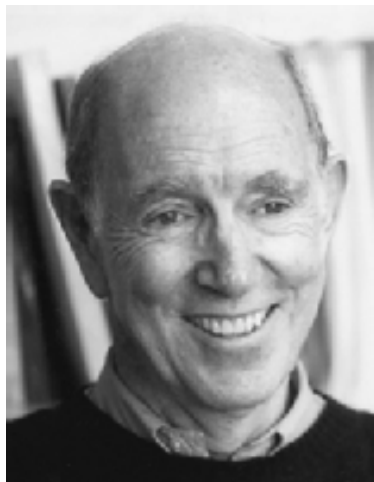


Cross-Cultural and Historical Perspectives on the Developmental Consequences of Education

Michael Cole

2005

Based on a lecture given at Oxford University, 1 November 2002



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Part 2 of 3 Parts

Consequences of Schooling in Post-Colonial Societies

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The Consequences of Schooling in Post-Colonial Societies

Although there were some attempts to assess the cognitive and social impacts of formal schooling compared to indigenous forms of enculturation prior to World War II, by and large the beneficial effects of formal schooling were assumed to be self-evident to European and American policy makers. During the 19th century, teachers, often missionaries, followed European troops to help carry the 'white man's burden.' Asia, South America and Africa all experienced this form of cultural penetration. One participant in such work referred to women teachers sent to the Philippines in 1901 as 'a 'second wave of troops,' remarking that the school in which she taught was no different in content from what was concurrently occurring in schools across the United States [Cleaves, 1994 quoted in Rogoff, 2003].

A small sample of statements by the founders of UNESCO, a secular organization, reveals clearly the way in which the founders of the UN viewed their mission:

"... the wide diffusion of culture, and the education of human beings for justice and liberty and peace, are indispensable for the dignity of man [UNESCO, 1951, front piece].

"... ignorance is not an isolated fact, but one aspect of general backwardness which has many features, like paucity of production, insignificant exports, poor transport and communications, deficient capital and income, [etc.] [UNESCO, 1951, p. 4]."

In the spirit of UNESCO's view, economist Daniel Lerner, who assumed that schooling was essential to the process of becoming modern, argued that a key

attribute of modern thinking is the ability to take another person's perspective and to empathize with their point of view [Lerner, 1958]. Lerner was quite specific about the relationship between psychological modernity and modern economic activity. The ability to take another's point of view, he wrote, 'is an indispensable skill for moving people out of traditional settings ... Our interest is to clarify the process whereby the high empathizer tends to become also the cash customer, the radio listener, the voter' [Lerner, 1958, p. 50].

The inability to adopt another's point of view is, of course, the central characteristic attributed to the thinking of 3- to 6-year-old children by Jean Piaget. Some did not shrink from drawing the obvious conclusion. C.P. Hallpike summarized decades of psychological research comparing the intellectual performance of educated and non-educated people of various ages on Piagetian and a wide variety of other cognitive tasks. With very few exceptions, the schooled participants outperformed those who had not attended school. These differences between schooled and non-schooled children led him to conclude that most of the time, 'primitives' do indeed think like small children [Hallpike, 1979].

Empirical Evidence

The reader who is interested in a comprehensive survey of the intellectual and social consequences of school is referred to extant summaries by Rogoff and Waddell [1982] and Serpell and Hatano [1997]. For present purposes, two examples describing the kind of performance changes that appear to be associated with schooling illustrate the basis for such broad-reaching conclusions concerning the dependence of cognitive development on schooling.

Donald Sharp and his co-workers studied the potential impact of schooling on the way Mayan Indians on the Yucatan peninsula of Mexico organized their mental lexicons [Sharp, Cole, & Lave, 1979]. When adolescents who had attended high school one or more years were asked which words they associated with the word 'duck,' they responded with other words in the same taxonomic category, such as 'fowl,' 'goose,' 'chicken,' and 'turkey.' But when adolescents in the same area who had not attended school were presented with the same word, their responses were dominated by words that describe what ducks do ('swim,' 'fly') or what people do with ducks ('eat'). Such word associations are often used as a subscale on IQ tests, where duck-goose is accorded a higher score than duck-fly. In addition, a good deal of developmental research shows that in the course of development, young children are more likely to produce duck-fly than duck-goose. The results of this study and findings from other parts of the world [such as Cole, Gay, Glick, & Sharp, 1971] suggest that schooling sensitizes children to the abstract, categorical meanings of words in addition to building up their general knowledge.

A meticulous study by Daniel Wagner suggested that children who attend school gain memory-enhancing skills [Wagner, 1974]. Wagner also conducted his study among educated and uneducated Maya in the Yucatan. He asked a large number of people varying in age from 6 years to adulthood to recall the positions of picture cards laid out in a linear array. The items pictured on the cards were taken from a popular local version of bingo called 'lotería,' which uses pictures instead of numbers, so Wagner could be certain that all the pictures were familiar to all of his subjects. On repeated occasions, each of seven cards was displayed for two seconds and then turned face down. As soon as all seven cards had been presented, a duplicate of a picture on one of the cards was shown and people had to point to the position where they thought its twin was located. By selecting different duplicate pictures, Wagner in effect manipulated the length of time between the first presentation of a picture and the moment it was to be recalled.

Earlier research in the United States had demonstrated a marked increase in children's ability to remember the locations of cards after they reached middle childhood [Hagen, Meacham & Mesibov, 1970]. Wagner found that the performance of children who were attending school improved with age, just as in the earlier study by Hagen and his colleagues. However, older children and adults who did not attend school remembered no better than young children, leading Wagner to conclude that it was schooling that made the difference (fig. 2). Additional analyses of the data revealed that those who attended school systematically rehearsed the items as they were presented, leading to the improvement in their performance.

These findings make it appear that schooling helps children to develop a new, more sophisticated, repertoire of cognitive abilities. In the case of word associations, it appears that a more mature, scientifically organized lexicon comes into being. In the study of memory, it appears that schooling promotes specialized strategies for remembering and so enhances children's ability to commit arbitrary material to memory for purposes of later testing. Had this research been conducted in the United States, older children or adults who responded in the less sophisticated ways would have been suspected to suffer some form of mental retardation.

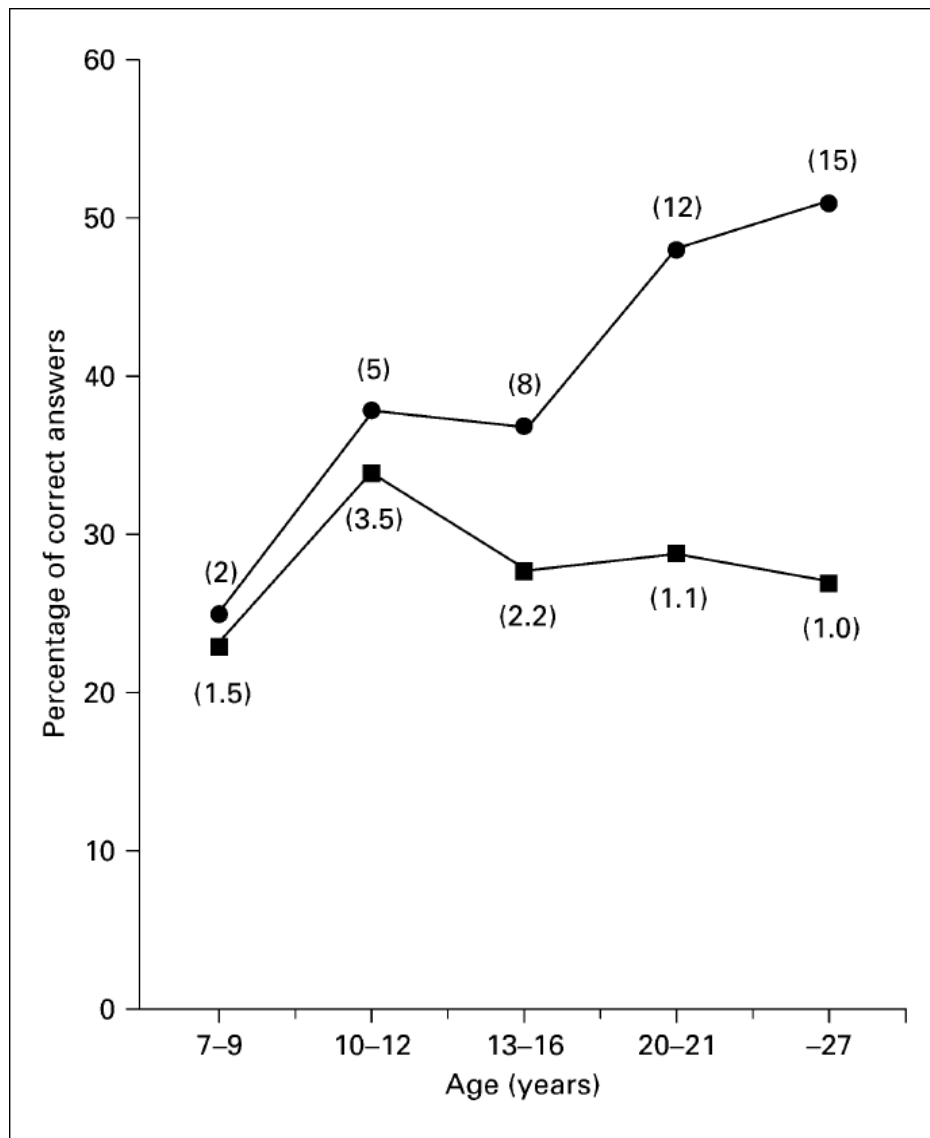


Fig. 2. Short-term memory performance as a function of age and years of education. Note that performance improves only as a function of years of schooling.

But there are serious reasons to doubt that differences obtained with standard psychological testing methods provide any logical evidence at all for generalized changes in classical categories of cognitive functioning. For example, it is not plausible to believe that word meaning fails to develop in children who have not attended school. The nonliterate Mayan farmers studied by Sharp and his colleagues knew perfectly well that ducks are a kind of fowl. Although they did not refer to this fact in the artificial circumstances of the free-association task, they readily displayed awareness of it when they talked about the kinds of animals their families kept and the prices different categories brought at the market. Similarly, when the materials to be remembered were part of a locally meaningful setting, such as a folk story or when objects are placed in a diorama of the subjects' town, the effects of schooling on memory performance disappear [Rogoff & Waddell, 1982; Mandler, Scribner, Cole, & De Forest, 1980].

Questioning the Validity of the Evidence

Such demonstrations led our research team to conclude that when schooling appeared to induce new cognitive abilities, it might well be because the entire structure of standardized testing procedures served as covert models of schooling practices. We noted that virtually all of our experimental tasks, modified or not, bear a strong resemblance to the tasks children encounter in school but little or no relation to the structure of the intellectual demands they face outside of school. Piagetian water conservation tasks, word associations, and remembering arbitrary arrays of objects are reasonable cases in point. When, except in school or on a quiz show, does one encounter such a task? Might it not be the case that in school children learn relatively restricted cognitive skills and do not undergo any general cognitive change?

The logic of this sort of comparative work appeared to demand that we find tasks that schooled and unschooled children from the same town encounter with equal frequency, and then demonstrate that children who go to school solve the problem in more sophisticated ways that are specifically tied to their schooling. Failure to find tasks of equal familiarity, in effect, meant that we were treating psychological tasks as neutral with respect to their contexts of use when this was patently false.

At the same time, the finding of school/non-school differences, if treated as specific forms of skill acquisition, did not mean that schooling exerts no significant impact on children. First, as many have noted, schools are places where children's activity is mediated through print, which not only adds a new mode of representation to the child's repertoire but introduces a whole new mode of discourse [Olson, 1994]. At a minimum, it seems certain that practice in representing language using writing symbols improves childrens' and adults' ability to analyze the sound structure and grammar of their language [Morais & Kolinsky, 2001], a finding which Peter Bryant and his colleagues have made good use of in the design of programs for the teaching of reading [Bryant, 1995; Bryant & Nunes, 1998]. Such metalinguistic awareness requires schooling. Vai farmers from north-western Liberia showed similar increased language analyzing abilities even though they had acquired literacy apart from schooling [Scribner & Cole, 1981]. Consequently these effects found in both economically developed, highly schooled societies and societies with limited forms of literacy and formal schooling, while not trivial, do not indicate that education produces any general influence on children that can be considered superior to the kind of enculturation that has existed in all societies throughout human history.

This realization led us on a multi-year investigation of the methodological foundations of experimental approaches to cognitive development: When and how might it be possible, we asked, to identify cognitive tasks that occur in everyday lives of villagers and townspeople in countries where modern schooling is unevenly distributed so that we could assess how schooled and non-schooled people tackled tasks of equivalent significance and familiarity? That it inculcates specific skills which may well be of economic and social value is not in dispute, although the proportion of children who achieve such valued skills while still in school is only a fraction of those who enter the institution of schooling initially.

In the intervening years, a great deal of work has been done to provide more plausible measures of the outcome of schooling. A number of investigators, for example, studied how children and adults who attend school versus those who engage in some other activity using mathematically equivalent tasks (such as selling candy on the street, or measuring cloth, or calculating the area of a building site) make various calculations [Nunes, Schliemann, & Carraher, 1993; Saxe, 1994]. What this research has repeatedly discovered is that groups differing in their amount of school-based experience or every-day, work-related experience, approach the same task (logically speaking) in very different ways. The schooled subjects' reliance on written algorithms often lead them to make egregious errors, while the mathematical activities arising in the course of candy selling or calculating the ratio of one board length to another was both quantitatively superior and free of nonsensical answers. Moreover, in a number of cases, the procedures acquired informally in the course of work were more adequately generalized, undermining the oft-repeated idea that such knowledge was somehow bound to particular contexts of use. Rather, it has turned out that it is knowledge acquired in school that is most vulnerable to becoming encapsulated.

At the same time, one does not want to overstate the virtues of on-the-job mathematics learning. Researchers have obtained such findings only at relatively rudimentary levels of mathematics and it is unlikely that the calculus or string theory would arise without special institutions for the teaching of mathematics precisely as an abstract form of knowledge. These are important issues to pursue, but owing to lack of space, I wish instead to turn my attention in a different direction and to answer the rhetorical question, 'Where could cognitive skills and modes of discourse such as those learned in elementary school find application outside of school of equal relevance to schooled and non-schooled populations?'

A Shift in Focus: Intergenerational Studies of the Impact of Schooling

Actually we provided an answer to this question in our monograph on the consequences of education in the Yucatan [Sharp, Cole, & Lave, 1979]:

“... the information-processing skills which school attendance seems to foster could be useful in a variety of tasks demanded by modern states, including clerical and management skills in bureaucratic enterprises, or the lower-level skills of record keeping in an agricultural cooperative or a well-baby clinic. (p. 84) “

While we did not follow up on the implications of this conclusion, Robert Le-Vine and his colleagues [LeVine & White, 1986; LeVine, LeVine & Schnell, 2001] did, in a program of research that provides what I believe to be the most convincing evidence of the cognitive and social consequences of schooling, and one that has extremely important policy implications as well.

These data focus on the ways in which formal schooling changes the behavior of mothers toward their offspring and their interactions with people in modern, bureaucratic institutions, as well as the subsequent impacts on their children. Le Vine and his colleagues start from three major changes in maternal behavior that have been widely documented by demographers over the last several decades: the children of women who have attended elementary school experience a lower level of infant mortality, better health during childhood and greater academic achievement. These researchers propose a set of plausible habits, preferences and skills that children acquire in school which they retain into adulthood and apply in the course of raising their own children. This set includes, in addition to rudimentary literacy and numeracy skills:

- (1) Discourse skills involving using written texts for purposes of understanding and using oral communication that is directly relevant to the negotiation of interactions in health and educational settings involving their children.
- (2) Models of teaching and learning based on the scripted activities and authority structures of schooling, such that when in subordinate positions schooled women adopt and employ behaviors appropriate to the student role and when in superordinate positions, adopt behaviors appropriate to the teacher role.
- (3) An ability and willingness to acquire and accept information from the mass media, such as following health prescriptions more obediently.

LeVine, his colleagues and others have carried out an impressive set of studies sampling many parts of the world, on the basis of which they offer a general model of how school-based learning, although it does not produce generalized sociocognitive change at the time, does produce context-specific changes in behavior that have quite general consequences with respect to the task of child

rearing, which in turn produces general consequences in the next generation (see figure 3).

A great deal more research needs to be done to clarify important causal relations hidden in the diagram in figure 3. For example, how much education of what kind produces what levels of behavioral change? How serious might selection factors be in the reported results? But at least as important are questions about what has been lost in return for the obvious benefits of reduced infant mortality or the ability to perform better in schools. As LeVine and White [1986] comment, modern schooling as part of the rationalization of technologically advanced nation states is not an unproblematic moral good. At present it rests upon forms of age-grading that alienate generations from each other and put individuals within generations into competition with each other in ways that are also alienating. It also disrupts family life by leading those who obtain high levels of schooling to migrate to the city or to other countries in search of work commensurate with their education [Serpell & Hatano, 1997]. Most ominously, the forms of production that result from schooling are part of a world-wide acceleration of the decimation of the earth as a common ecology for human life that may push human kind inescapably down the path to total extinction.

Cultural Variations and School Achievement in Technologically Advanced Nation States

Among the major modern nation states, with their well-developed state institutions and a heavy reliance on modern technologies as an essential component of economic activity, there are two kinds of concerns about the intersection of schooling and culture. The first concerns cross-national comparisons. There are marked discrepancies in achievement levels between countries when schools adopt essentially the same curricula designed to inculcate the same skills. The second concerns cultural variations within modern nation states among different ethnic groups, a problem long of concern in the United States, but one which has become of increasing concern in many countries owing to the de facto existence of, and in at least some cases the urgent economic need for, immigration. I will treat the two cases separately because they raise somewhat different issues.

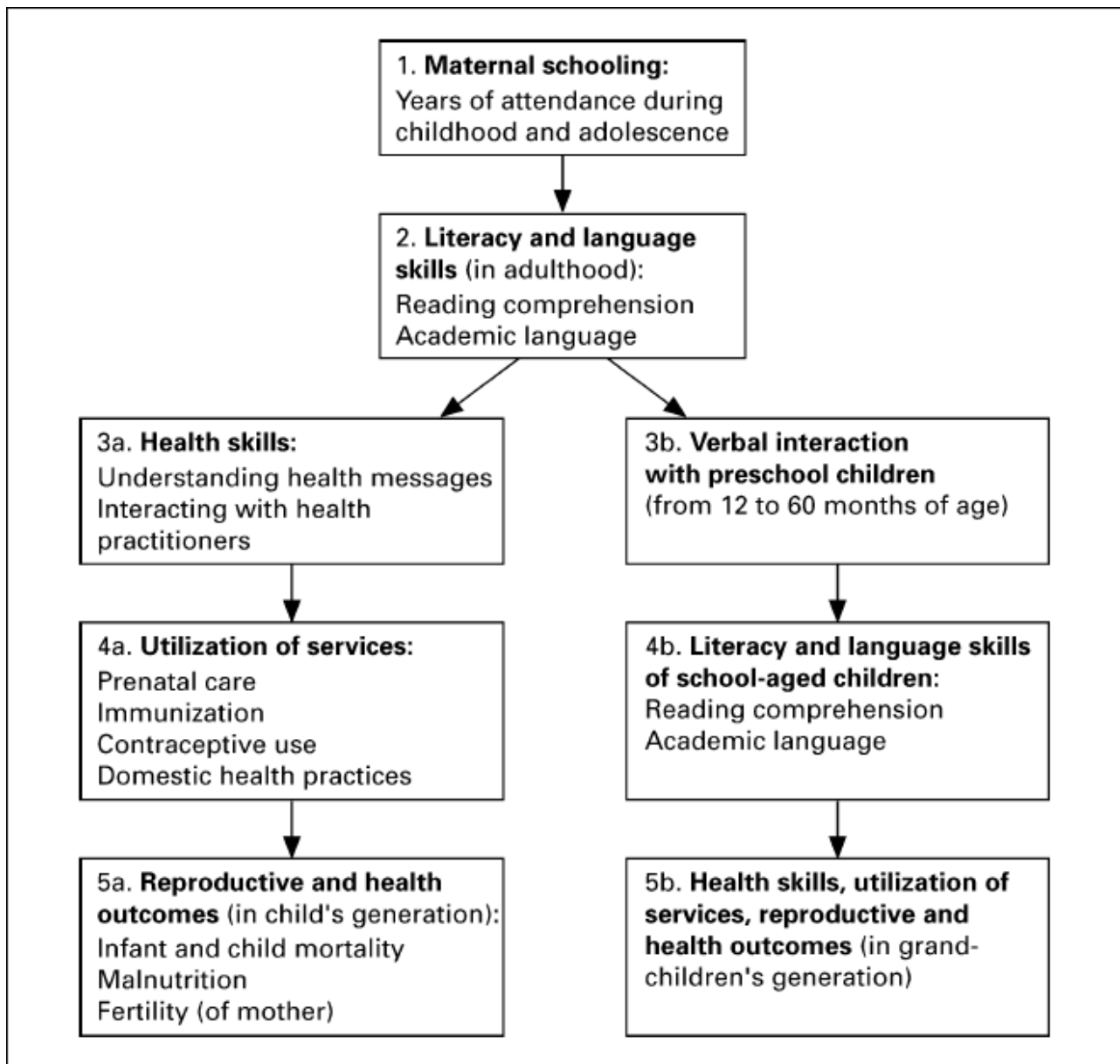


Fig. 3. Hypothetical influences of maternal literacy on health and child development [LeVine, LeVine & Schnell, 2001].

Cross-National Comparisons

Cross-national comparisons became a matter of intense debate in the 1980's largely as a result of Japan's economic achievements, which evoked deep concern in the United States indexed by a report from the National Research Council entitled *A Nation at Risk*. The impetus of this concern resulted in a massive, and repeated, set of cross-national studies, the most systematic of which focuses on mathematics and science at various grade levels (the Third International Mathematics and Science Study, TIMSS). The basic results of this study for 8th-grade mathematics indicate that the East Asian countries of China, Japan and Singapore score higher than

Western European countries, with the US and England more or less at the bottom of the list.

While the quantitative differences are clear enough, the reasons for them, and particularly those reasons that can rightly be termed ‘cultural,’ are more difficult to summarize. First, there is the problem of where to look. Most of the looking relevant to characterizing cultural factors associated with performance has been done in the classroom. James Stigler and James Hiebert [Stigler & Hiebert, 1999], who conducted ethnographic research in conjunction with the 1997 TIMSS study contrast Japanese, German, and U.S. classroom cultures in this way in the following terms (pp 25ff):

- *German teaching focuses on developing advanced procedures. The teachers lead the students through the development of procedures, including their rationale and the general classes of problems for which they are appropriate.*
- *Japanese teachers organize structured problem solving. They present demanding problems and organize the students to engage in active problem solving. Their major role is to design and orchestrate the lessons so that students are likely to use procedures from prior lessons as a starting point.*
- *US teachers seek to have their students learn terms and practice procedures. The content of the lessons is less demanding and less mathematical reasoning is expected. One observer commented wryly that in the US classrooms, ‘there are the students and there is the teacher. But I have trouble finding the mathematics.’*

When we look for cultural factors which might underpin these classroom differences, there are many hints that they are present, but their presence quickly leads to new questions. For example, when one American teacher viewed the tapes, he sought to implement the Japanese problem-solving approach in his classroom, but he failed. The students, gathered in small groups, waited to be told what procedures to use. Alternatively, when observers in an early study in this series scored the percentage of time during teacher-led sessions when the students were paying attention, they found that only 45% of the American children were attending to the teacher in comparison with almost 70% of the Japanese children, a difference found at both the 1st and 5th grades. [Stevenson, Lee, & Stigler, 1986]

In addition to within-classroom cultures, we also need to consider the role of the society of which the school is a part. Thus we must also take into account a variety of features that can loosely be referred to as ‘social cultural’ and which contribute to national differences that are relatively easily to quantify. Amount of time spent in the classroom doing mathematics is one obvious factor, as is level of teacher

preparation. Performance correlates closely with such resource measures across countries. Outside the classroom the educational level of parents, amount of time spent doing homework, and respect accorded to the teaching profession are additional factors of importance. All these factors can be considered cultural in so far as they speak to the value of mathematics and science education within the society as a whole.

Perhaps the most difficult factors to specify and link quantitatively to cross-national differences performance are cultural factors that appear to operate at the level of the state, such that a 'national style' of thinking is characteristic of people in large political/geographically circumscribed 'cultural groups.' For example, early childhood enculturation in Japan presupposes a notion of personhood which emphasizes interdependence, mutuality of trust, and the high value accorded to self-discipline and perfectionism in fulfilling one's role [Befu, 1986] – in contrast with a more individualistic mentality that is said to characterize the West.

With respect to Japan and China, which differ internally in many ways, it has been argued that these features combine with a strong belief in effort rather than innate ability as the cause of success in all fields of endeavor. The combination is a potent one when it is achieved in school. It is no wonder, for example, that while 'not in assigned seat' is a relevant variable in coding behavior of American children, in Japan it happens too rarely to be useful.

These facts speak strongly to the need to assess the consequences of schooling in relation to the whole of its parts; schooling is only one of many enculturating institutions that children routinely encounter. Thus it is not difficult to see the perplexity in the children and the difficulties teachers encounter when they seek change at the classroom level in the absence of changes in the broad socio-cultural formation of which they are a part. Some who admire Japanese classroom achievements have sometimes sought to encourage adoption of Japanese teaching methods as a means of overcoming achievement gaps, but the story of the American teacher who attempted to change an eighth grade classroom points squarely at the problem: classroom interactions are embedded in, and rest upon, an enormous amount of cultural conditioning. Schooling is only one institution in a vast complex of culturally organized institutional arrangements. Changing only one part of the system without changing other parts is at best a risky enterprise.

Moreover, as in the case of the introduction of modern schooling into agrarian low-technology societies, one has to consider the costs as well as the benefits. As Harami Befu [1986] points out, the school system which many Americans so admire also gives rise to violence and bullying in middle school, abuse of parents, glue sniffing and outright refusal to leave home for school.

The same need to adopt a polycontextual point of view applies to all efforts to understand the consequences of schooling in its national socio-cultural context. 'Western-style' schooling, while retaining certain key features, it locally adapted in a multitude of ways. If one considers it a blessing, it is a mixed blessing at best.

Within-Nations Cultural Variations

Often overlooked in cross-cultural studies of education is that studies comparing different cultural and ethnic groups that have appeared in Europe and the United States, and whose numbers in many countries are increasing, offer important ground for research into what it would mean to create mixed educational environments that capitalized on the inescapable cultural diversity [Gallego, Cole, & LCHC, 2001]. The issue of immigration, diversity, and citizenship is unavoidable in any country in Northern Europe or North America. When a previously homogenous country such as Finland is told that it must encourage immigration for its own economic survival, one knows that the problem of how cultural variation influences educational achievement is serious indeed.

In some respects the issue of within-country variation in culture and education is the historical consequence of the very factors that produced the spread of European-style education in the first place. Having promoted universal education as the engine of modernization and relinquishing direct political control over former European colonies, we are finding that the formerly colonial peoples 'over there' have agreed to the superiority of our way of life, at least its material aspects, and now have made their appearance 'over here.'

The reactions and counter-reactions this situation has caused permeate all aspects of society. (I confine my comments here to the American situation, which I know best and leave it to readers from other countries to make appropriate generalizations to their local circumstances.) Roughly speaking there are four approaches to dealing with the problem of cultural diversity and schooling, the first of which was outlawed in the United States in the middle of the last century, but is returning in various guises.

(1) The doctrine of separate but equal which came into effect with the end of the American Civil War, before which time most African-Americans lived in slavery and were forbidden by law to get an education. Under the separate but equal doctrine, non-Anglo children (primarily African-American and Mexicano) were segregated into their own schools and given an education that mimicked the general European model. The fact that teachers were poorly paid and trained, the facilities generally abysmal, and the families needed the children's labor for significant periods meant

that such education, however separate, was never equal. And the possibility of appropriating indigenous forms was never seriously considered.

(2) The effort to modify standard curricula in a way that builds upon indigenous enculturation practices either as a supplement to standard schooling (e.g., religious schools that meet during the after-school hours or on the weekends, or Japanese 'juku,' which offer a variety of supplements, usually drill and practice in basic skills) or as a 'bridge' to standard schooling. A large, early, and apparently successful effort of the bridging sort was conducted in Hawaii, where indigenous modes of talk and interaction were blended into school lessons [Tharp & Gallimore, 1988]. Another effort has included starting high school literature classes using literature containing speech genres known and appreciated by the student body and then, once analytic grasp of these strategies has been mastered, showing students how the same techniques could be used for analyzing Euro-American literature [Lee, 1998].

(3) Efforts to break down the separation of school and community and incorporate the legitimate knowledge with which non-Euro-American children come to school by directly tapping into their local funds of knowledge. This boundary crossing is achieved by having teachers spend time in their local communities and by inviting local community adults with special expertise into the school [Moll, 1992; Gonzalez, Andrade, Civil, & Moll, 2001].

(4) The fourth approach, which reigns at present in my home state of California, is to deny any relevance to cultural variation in schooling and to mandate total immersion of immigrant children in Euro-American educational and cultural forms, outlawing the use of home languages and cultural practices in the school. This approach effectively treats home language and culture as problems to be eradicated. Owing to geographical clustering of ethnic groups within regions, this form of education often comes to approximate de facto the de jure 'separate but equal doc-trines' of the early 20th century.

As one can imagine, each of these approaches meets with various kinds of objections and there is a great deal of confusion about what part of which disparities in educational outcome are associated with cultural difference and which parts are surrogates for lack of resources, real material resources or mythical mental ones.

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For the full list of References, please see part 3.

Course: Education

23032, Cole, Perspectives, Part 2, Post-Colonial Consequences, 2005

4816 words